

## Introduction

For this subsystem the goal is to design the track layout and decorations. The decorations around the track have to keep the visitors immersed in the story of Thumbelina, together with auditory storytelling, and sound effects. The layout of the track had to allow for the desired throughput, fit inside the

building and adhere to physical constraints like maximum possible bends. The design of the carts had to be visually fitting, but also be functional and follow design choices made by other subsystems. Finally our plans should be tested for integration with the rest of the system.

## External Interfaces and Communication

This subsystem has information flow to and from other subsystems. Some of the decor parts and all of the sound effects need to be activated and deactivated depending on the location of the carts. This is done automatically by the overarching control system. This process is monitored by staff in the control room. The attraction contains a photobooth. The pictures taken during the ride need

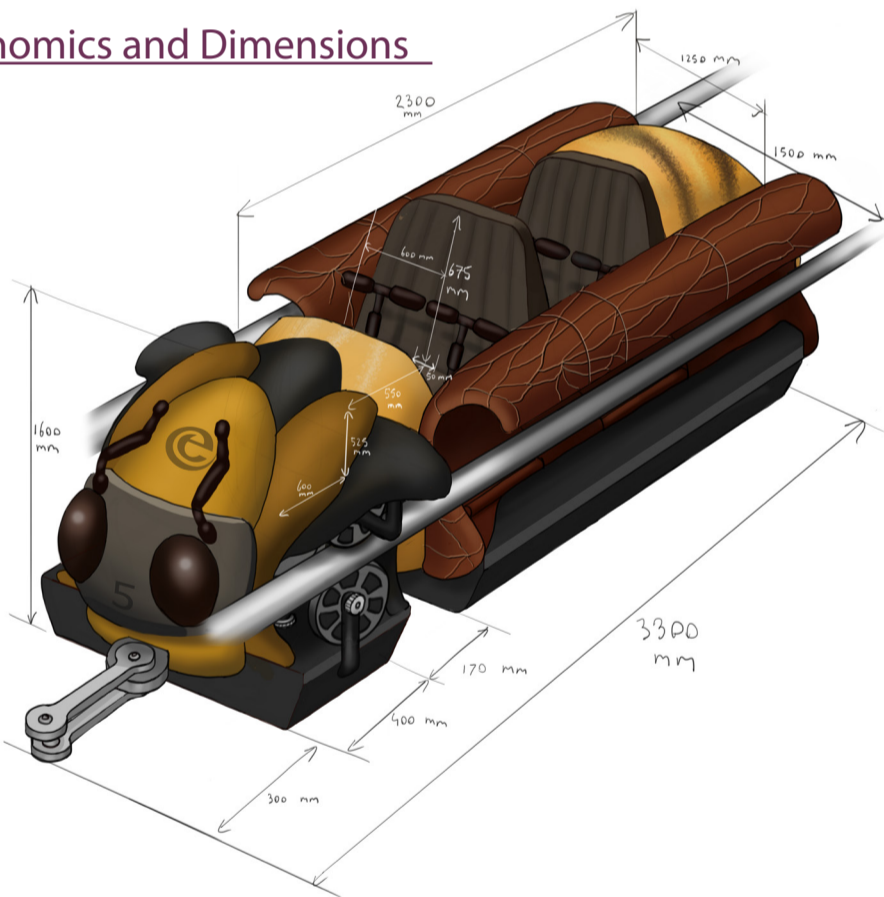
to be sent to the photobooth in the exit subsystem. In the different sections of the ride, the trains need to move, or stop moving. This means that the location of the trains should be communicated to the operators so they can start the trains moving when they are on tow-territory. The stopping of the ride should be automatic and calculated.

## Cart design

Thumbelina's adventure starts when she is invited on a bumblebee ride by the fairy prince. The bumblebee was the main inspiration for the cart. To

keep the illusion of littleness convincing, it was decided to have the seats lowered in the bumblebee's back, in between the rails.

## Ergonomics and Dimensions



Using the DINED database, extreme proportions (99th percentile) were determined which gave us the sizes of the seats, and spaces between them. This gave an estimation on the cart size together with mechanically required sizes. The cart is accessible by people in a wheelchair, although a transfer is necessary. This is not uncommon practice in de Efteling.

Employees need to check the seatbelts and close them if needed. As the carts and seatbelts are quite a bit lower than the platform, the staff will use rods as an extension of their arm to push down belts where needed. This allows them to do their jobs without straining their backs.

## Integration and Test Plan

A full plan for integration and testing the subsystem into the system can be found in the handouts. There the means for assessing each relevant requirement and interface are described.

Assuming all parts of the subsystem pass these tests, the subsystem will be fully approved and the next step is whole system integration.

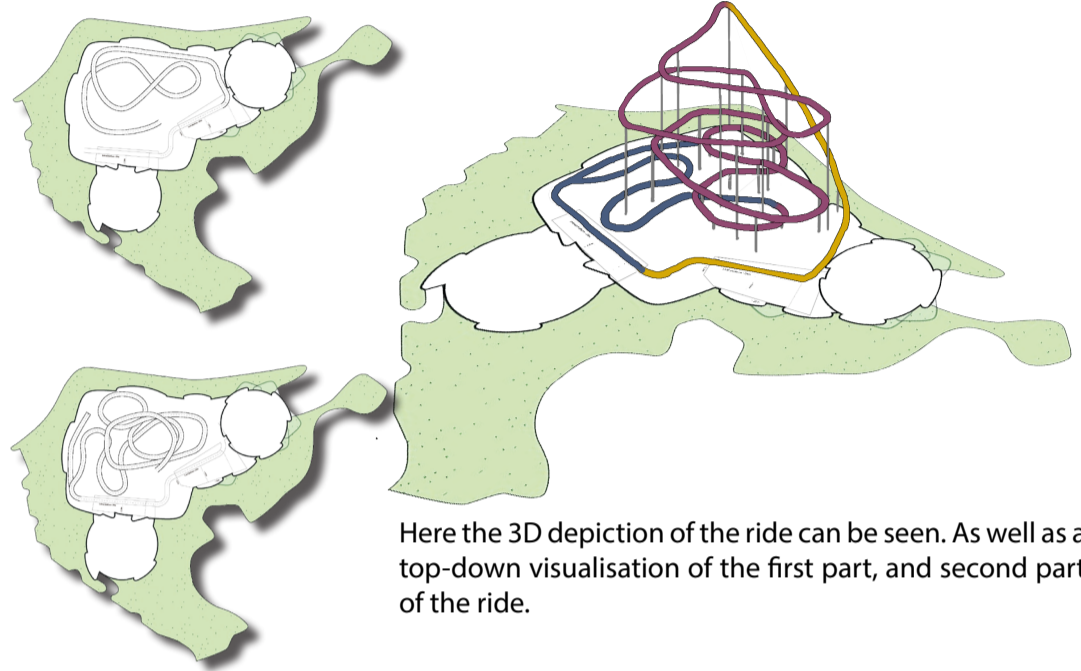
## Subsystem Requirements

This list contains the most essential requirements of this subsystem. A more complete list can be found in the handouts.

- The ride must be an immersive experience for the entirety of its duration.
- The ride must fit within the area and size boundaries given by System Engineers.

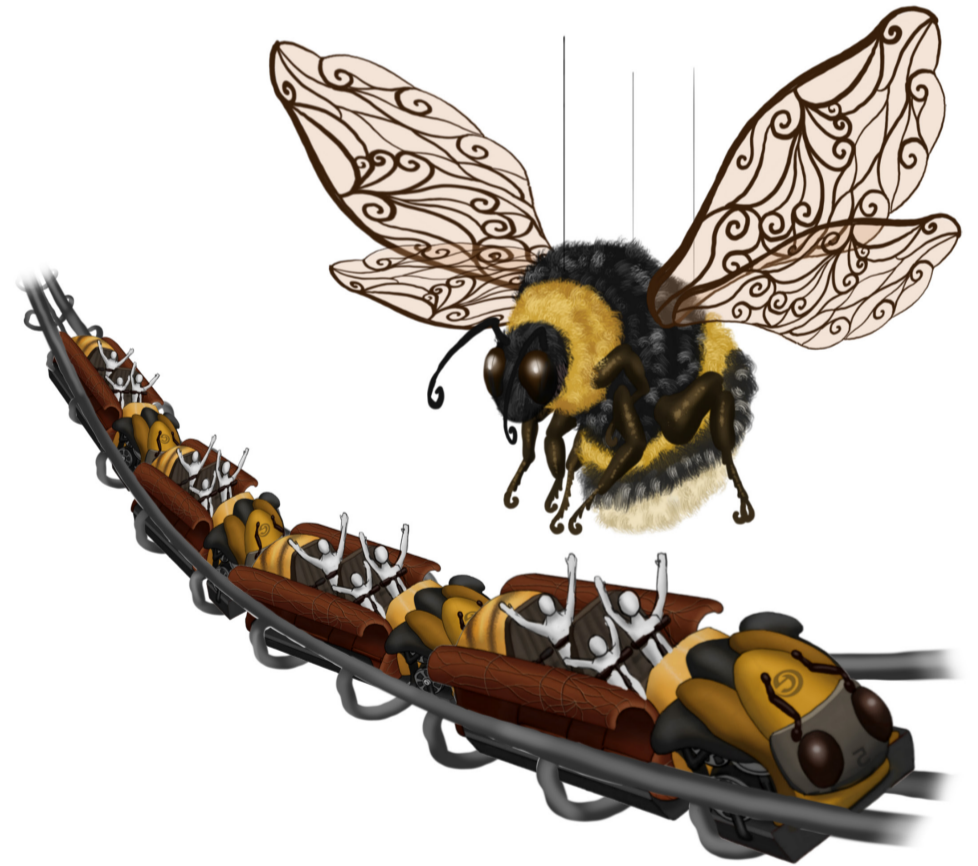
- Decor must activate based on the position of the carts.
- There should be a camera to capture pictures of the visitors during a thrilling part of the ride.
- The ride and cart should account for ergonomics for all stakeholders.

## Layout



Here the 3D depiction of the ride can be seen. As well as a top-down visualisation of the first part, and second part of the ride.

## Decor Pieces and Immersion



Above you can see one of the decoration pieces in the thrilling fast section. Below the decoration in the first slow, and tow up section is depicted.

